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ABSTRACT

Forty-eight first grade students participated in a three-fold study to (1) examine the effect of repeated exposure to text on memory for prose as determined through retelling, (2) determine how low and high comprehending students performed on this task, and (3) determine if males would perform as well as females on the task. The subjects were divided into four categories--high and low comprehending male readers and high and low comprehending female readers. They then listened to and retold a story three consecutive times in one sitting. The findings revealed no significant difference between high and low comprehending readers in reproducing responses. Females, whether high or low comprehending readers, scored significantly better than males in almost all areas of the study. (FL)

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PROSE MEMORY OF HIGH AND LOW COMPREHENDING READERS: EFFECTS OF REPEATED EXPOSURES

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The purpose of this paper, in addition to attempting to support the constructivist model of discourse processing, is to present the results of a study which was three-fold: 1) To look at the effect of repeated exposure to text on memory for prose as determined through retelling, 2) To determine how high and low comprehending first grade readers, as categorized by the paragraph meaning subtest of the Stanford Achievement Test performed on this task, and 3) Through the differentiation of the subjects on the basis of sex, determine if first grade males, high and low comprehending, would perform as well as first grade females, high and low comprehending on the presented task. The subjects, divided into four categories stated above (high and low comprehending readers male, and high and low comprehending readers, female) listened to and retold a story three consecutive times in one sitting.

Carroll (1972) has suggested that comprehension of a message can be considered adequate or satisfactory to the extent that the language receiver apprehends, at least provisionally, whatever linguistic information is present in the message and is able to relate that information to whatever context is available at a given time. He suggests too, that a procedure for measuring comprehension that meets the criteria for tests of comprehension, namely validity, reliability, generality, convenience, and practicality is simply to ask for a reproduction or retelling of the message with the condition of testing being that the response is elicited immediately following the presentation of the message.

This procedure, that is retelling, immediately following the presentation

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of the message, was first used by Bartlett (1932) and has since gained promise as a means of measuring comprehension of meaningful written material.

Frederiksen (1975) and Mandler and Johnson (1977) have also used retelling, asking examinees to recall the passage without directing the nature of the recall.

The model of comprehension used in this study is that model described as the constructivist conception of discourse processing (Bartlett, 1932, Bransford and Franks, 1977, Frederiksen, 1972, 1977). The constructivist model as refined, posits that the memory system does not semantically process each input sentence in its entirely. Rather, it selectively processes the input using information selected from the current input sentence together with contextual information and stored knowledge about the world. These two types of information, according to this model, generate a semantic interpretation which fits the input data.

The study to be discussed here is an extension of one conducted by Frederiksen (1975) using adult subjects. The adults in his study listened to and retold in writing a story over repeated exposures. This researcher changed the study to include first grade children and extended the study by separating the children being tested into differing ability levels as indicated by their scores on the paragraph meaning subsection of the Stanford Achievement Test. The study also differentiated males and females since first grade studies repeatedly show that there is a difference in performance of the sexes at this level.

Forty-eight subjects representing middle and upper class first grade children were examined. The subjects were divided into four equal groups of twelve. These four groups comprise the independent variables which were high comprehending readers, male, low comprehending readers, male, high comprehending readers, female, and low comprehending readers, female. High comprehending readers were defined as those who scored in stanines seven through nine on the paragraph meaning subtest of the Stanford Achievement Test. Low comprehending

readers were defined as those who scored in stanines one through three on this test and were not mentally retarded.

The children were asked to listen to and retell a story three consecutive times in one sitting. Their retellings were analyzed by comparing them to the original text and coding them against ten dependent variables. These ten dependent variables were divided into two groups - five concept categories and five relations categories. A conceptual unit closely resembled a pausal unit and was defined as a statement representing objects, states or events. Relations were a connection or linking of concepts. The story consisted of thirty sentences which were divided into seventy-eight conceptual units and fifty-five relations.

The categories most important to the study were the following:

1) Reproduced information - information given in paraphrase or exactly stated.
2) Overgeneralized information - in this instance the child reduces the semantic information through elimination of non-essential information.
3) Inferences - using the context and previous knowledge, the child draws an inference about the material in the story.

The Snowy Day by Ezra Jack Keats was chosen for taping. Each child's task was to listen to the taped story; retell the story; immediately listen again and retell; and then listen for a third time and retell. Each retelling was taped and later transcribed. Each time after listening to the story, the child was asked to "Tell me the story of The Snowy Day". The examiner did not probe except to say after endless silence on the subject's part, "Is that all?"

This researcher hypothesized that over trials, all subjects would increase the frequency of reproduced concepts and relations. Since, in line with the

constructivist model of discourse processing, reproduced information would increase as a result of new information being added. Since overgeneralized and inferred concepts remain a part of our memory structure unless contradicted, it was predicted that overgeneralized and inferred concepts and relations would increase in a negatively accelerated fashion or remain constant for all subjects.

It was also hypothesized that high comprehending readers would include more reproduced information than low comprehending readers and that females would include more reproduced, overgeneralized and inferred concepts and relations than would males.

Before considering the results of the study, it seems appropriate to note that children are traditionally classified as successful or unsuccessful readers on the basis of a standardized reading test score or by the informal assessment of the classroom teacher, an assessment which often involves oral reading and the answering of questions based on information directly stated in the text.

The constructivist model of discourse processing argues against the assumption that sentences "carry meaning" (Bransford, Barclay and Frank, 1972). People carry meanings and linguistic input merely acts as cues which people can use to recreate and modify their previous knowledge of the world. What is comprehended and what is remembered depends on an individuals general knowledge of his environment. The deepest level of processing, Craik and Lockhart (1972) would argue, involves enriching the stimuli by tying them to previously acquired associations, images and other relevant pre-existing knowledge. If a few words or sentences are sufficient to allow a listener to construct a description of a whole situation, he has more at his disposal than he actually heard. The constructivist approach thus postulates that the act of comprehension involves

more than merely recognizing or even concretizing the information specified in the input string (Craik and Lockhart, 1972). The input passage and prior knowledge in other words, results in a "whole that is greater than the sum of its parts".

One of the most important aspects of the study then, focused on whether or not high and low comprehending readers, as measured by a standardized test, would perform in the same manner, when recall in the child's own words was used as the yardstick for measuring comprehension.

The data for this study was analyzed using a three way analysis of variance with two between-subjects factors (high and low comprehending readers, male and female) and one within subject factor (number of trials). The level of significance needed to reject the null hypothesis was set at $p<.05$. A three way analysis of variance within a 2x2x3 design (two levels of sex by two levels of comprehension by three trials) was used.

Results: Although there were ten areas in which analysis was conducted, only the most significant of these areas will be discussed.

In order to support the constructivist model of discourse processing, it was necessary for the following to occur: If, as Frederiksen suggests, semantic information acquired inferentially and through the process of overgeneralization became a part of a person's memory structure for a story, it will not be altered unless contradicted. Also, as subjects are repeatedly exposed to the text, reproduced information should increase because the amount of new information waiting to be processed decreases. That is, repeated trials result in progressively less need to adjust to processing limitations.

In Figure 1, notice that mean frequencies of reproduced, overgeneralized and inferred concepts and relations are plotted for all subjects. Two scales are presented on the ordinate of each graph. On the left scale, frequencies

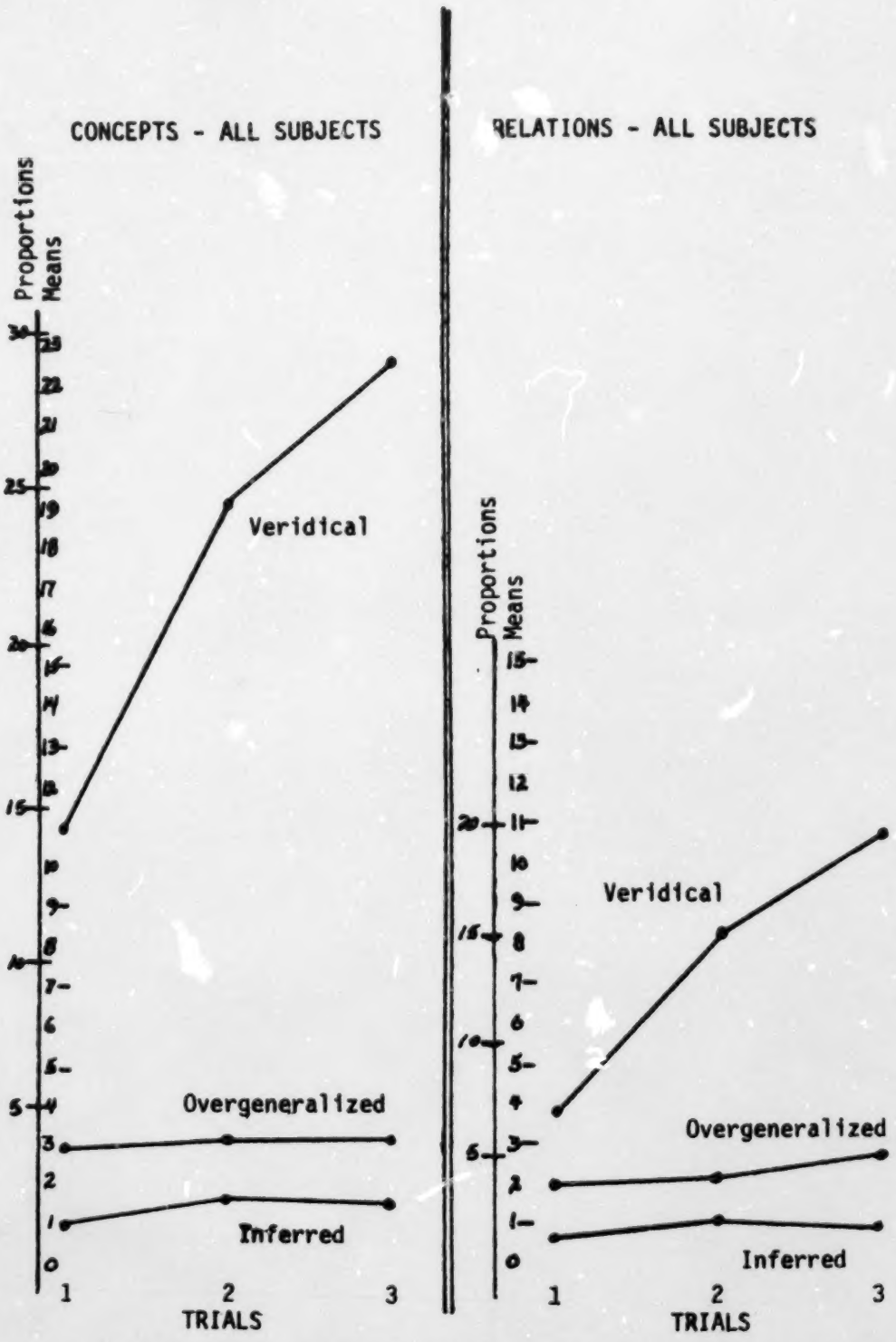

Figure 1: MEAN FREQUENCY AND PROPORTION OF RESPONSES FOR CONCEPTS AND RELATIONS FOR ALL SUBJECTS

are expressed as proportions of the total number of concepts, or relations in the passage. This proportion correct scale provides a way to compare frequencies across the two graphs.

Notice the level of recall for veridical concepts starts at a proportion of about fifteen percent and increases to thirty percent on trial three. On the other hand, the level of recall of reproduced relations starts at a proportion of seven percent and increases to twenty percent on trial three. The lower proportions for relations is due to the need for the child to "match up" particular concepts to produced relations. It is conceivable that a child could reproduce a large number of concepts but end up with few relations because of the lack of semantic structure in his retelling.

The increase in frequencies of both veridical concepts and relations over trials are statistically significant. The first hypothesis is supported. All subjects significantly increased the frequency of reproduced concepts and relations over the three exposures to the story.

The second and last significant effect I wish to examine is the sex effect. Figure 2 compares mean scores of males and females for reproduced, overgeneralized and inferred responses. In five of the eight significant effects reported for reproduced, overgeneralized and inferred concepts and relations, the sex variable was significant. In each of these cases, females performed significantly better across the means than did males.

In looking at Figure 2, first consider inferred responses: Females scored significantly better than males. It can be noted for inferred concepts the mean performance of females was significantly greater. The significant effect was between trials one and two for females and males.

In only one area was a stated hypothesis not supported and that is that there is no significant difference over trials for females over males in

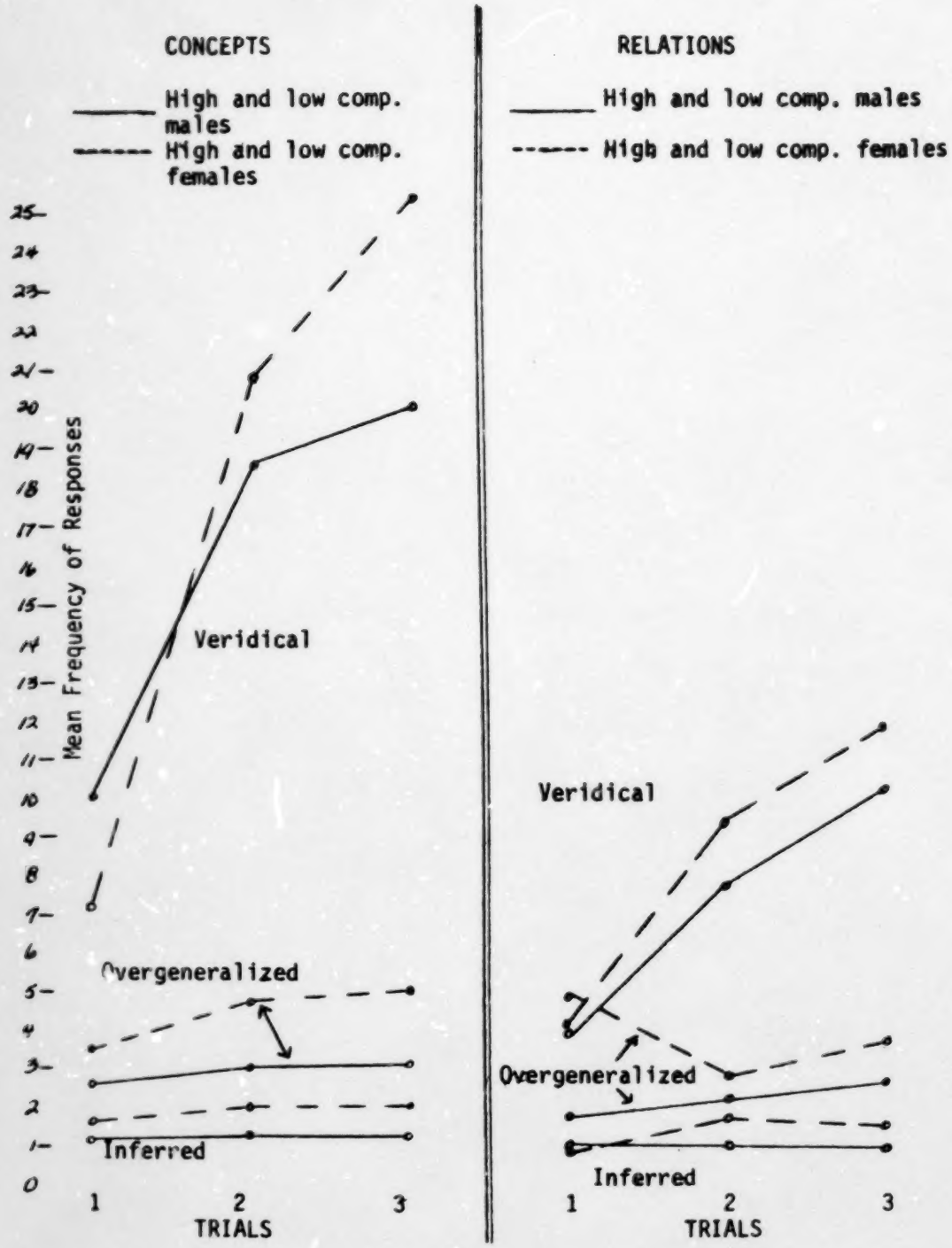

Figure 2: MEAN FREQUENCY OF RESPONSES FOR CONCEPTS AND RELATIONS OF HIGH AND LOW COMPREHENDING FEMALES AND MALES

overgeneralized relations.

Of interest to this study, is that the children simply did not elaborate in their retelling in contrast to the findings of several researchers in the areas of retelling (Mandler and Johnson, 1977).

Of particular note and importance is the fact that there was no significant difference between high and low comprehending readers in reproduced responses over trials as predicted. An examination of this data is pertinent. Both low comprehending males and low comprehending females, as identified by the Stanford Achievement Test gave responses that on the nature of retelling as a criterion would place them in the high comprehending category.

Females, whether low comprehending or high comprehending, scored significantly better than males in the areas of inferred concepts and relations. This is consistent with research in early reading. It has been observed that females do better than males in reading achievement. As a group, they learn to read earlier and fewer of them become reading disability cases (Alden, Sullivan and Durrel, 1941, Monroe, 1932, Stanchfield, 1965).

It bears repeating, however, that retelling responses for <u>all</u> subjects increased significantly over repeated exposure to the text.

The following interpretations might be made regarding the statistically significant results obtained from this study. First, repeated exposure to text makes a significant difference in the number of mean retelling responses of first grade children.

Secondly, overgeneralized and inferred concepts and relations do remain a part of the child's memory structure for the story. These are good responses, by the way, for they give the gist of the story.

As one looks at the discrepency between those children classified as high

and low comprehending readers, a question must be raised as to the use of the paragraph meaning subtest of the Stanford Achievement Test as a descriminator of high and low comprehending first grade readers.

To summarize, high and low comprehending readers demonstrated wide variability in their retelling scores. The variability between the two groups leads to speculation that the subtest of the Stanford Achievement Test, which was used to determine the groups into which subjects were placed, measured something quite different from the traits reflected in retelling. Given the findings of this study, it is apparent that the conception of comprehension inherent in the Stanford results in a classification of subjects that was not tapped in the retelling process.

A qualitative examination of the first grade children's responses is fascinating. The high quality of retelling of some children identified as low in comprehension implies a need to keep a record of children's retelling on tape as an additional measure of comprehending ability.

Although statistical findings were not evaluated, the study also lent support to the following:

1. Structural importance facilitates recall (Johnson, 1970, Mandler and Johnson, 1977, Brown and Smiley, 1977, Danner, 1976). In other words, what is most important is what is remembered.
2. Good order produces good recall.
3. Pausal units are the units of recall.

In conclusion, this study raises several questions which need to be critically considered through extended research or by way of classroom practice.

One exposure to text does not result in adequate recall. We've always known it, but what are we doing about it, especially in light of the results obtained from exposure, feedback, exposure and feedback?

While the results concerning the superiority of females over males in almost all areas of this study, whether high or low comprehending, is compatable with research concerning early reading, they should not be taken lightly. Expectations for males in the first grade classroom must be tempered in light of these findings until nature takes its course. Researchers who have recently examined retelling responses of children have not considered sex as an independent variable (Danner, 1976, Brown and Smiley, 1977, Mandler and Johnson, 1977). I would urge that continued research do so.

Lastly, the lack of significance between high and low comprehending readers as defined for this study raises serious questions about labeling and assessment. Is the emphasis on asking for answers to questions an adequate determiner of comprehension?

Retelling as a measure of comprehension is in the early stages of research. Because it reflects memory processing as we now know it, it has great promise. Continued research which can be translated into classroom practice is essential.

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